

## Methods for Producing L-Amino Acids

### *Cross-Reference to Related Applications*

*Claims domestic priority under 35 USC 119(e) to*

This application is a ~~nonprovisional~~ <sup>provisional</sup> of U.S. Application No. 60/145,217, filed July 23, 1999 and U.S. ~~Application~~ <sup>provisional</sup> No. 60/150,017, filed August 20, 1999, both of which contents are incorporated herein by reference.

### *Background of the Invention*

#### *Field of the Invention*

The present invention relates, in general, to a method of producing L-amino acids and to a gene encoding phosphoglucoisomerase.

#### *Background Information*

Bacterial cells are used industrially to produce amino acids by fermentation processes (Ishino, S. *et al.*, *J. Gen. Appl. Microbiol.* 37:157-165 (1991), Kinoshita, S., Nakayama, K. and Nagasaki, S., *J. Gen. Appl. Microbiol.* 4:128-129 (1958)). Although numerous research reports and reviews have appeared concerning fermentation processes and the mechanisms of accumulation of amino acids, more progress needs to be made to increase the yields of amino acids from microorganisms (Ishino, S. *et al.*, *J. Gen. Appl. Microbiol.* 37:157-165 (1991), Aida, K. *et al.*, eds., "Biotechnology of Amino Acid Production," Kodansha (Tokyo)/Elsevier (New York) (1986) and Marx, A. *et al.*, *Metabolic Engineering* 1:35-48 (1999)).

There has been some success in using metabolic engineering to direct the flux of glucose derived carbons toward aromatic amino acid formation (Flores, N. *et al.*, *Nature Biotechnol.* 14:620-623 (1996)). However, the successful application in producer strains has not yet been documented (Berry, A., *TIBTECH* 14:250-256 (1996)).

Metabolic engineering relates to manipulation of the flow of carbons of starting materials, such as carbohydrates and organic acids, through the variety

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